REMARKS

Claims 1-13, 15, 16 and 18-26 are pending. Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-12, 15-16, 18-22 and 23-26 were rejected under 35 U.S.C. § 103(a) based on European Patent Application Publication No. 1020897 to Tanaka (hereinafter "Tanaka") in view of U.S. Patent No. 6,533,952 to Klebanoff (hereinafter "Klebanoff"). The rejection is respectfully traversed.

Regarding claims 1 and 20, Applicant respectfully submits that cited portions of Tanaka and Klebanoff, taken individually or in any proper combination, fail to disclose or render obvious at least a lithographic projection apparatus comprising, *inter alia*, a gas supply control to control said gas supply to control, responsive to a signal from said at least one sensor, a thickness of a layer of hydrocarbon formed on the mirror using the gaseous hydrocarbon, as recited in claim 1, or a lithographic projection apparatus comprising, *inter alia*, a gas supply control configured to control supply of the gaseous hydrocarbon to the space to maintain a layer formed on the mirror using the gaseous hydrocarbon at a substantially constant thickness in response to at least sputtering caused during supply of the projection beam, as recited in claim 20.

The Office Action confirms, and Applicant submits, that Tanaka does not disclose hydrocarbons of any kind. Consequently, Tanaka cannot disclose or teach a protective layer of hydrocarbon as recited in the claims.

To overcome the deficiencies of Tanaka, the Office Action alleges that the claimed hydrocarbon layer is disclosed by Klebanoff. See, Office Action, page 4. Applicant respectfully traverses this allegation.

The cited portions of Klebanoff are silent as to a hydrocarbon layer, film, or any appropriate hydrocarbon layer synonym. Rather, Klebanoff discloses "an oxide film" (e.g., column 5, line 32), "carbon films" (e.g., column 6, line 16), "graphitic carbon film" (e.g., column 5, line 4), or SiO_2 layer (e.g., column 2, line 42), but not a hydrocarbon layer or film. Applicant submits that presence of a hydrocarbon in an atmosphere in contact with a mirror surface in Klebanoff does not necessarily result (as required for inherency - see MPEP § 2112) in hydrocarbon film

formation on the mirror surface in Klebanoff. Hydrocarbon film formation is conditioned on a number of factors such as the number of the available hydrocarbon molecules and surface conditions like temperature, surface geometry, surface potential, surface irradiation, impurity present on the surface, etc. The cited portions of Klebanoff are silent as to whether the conditions for hydrocarbon film formation are present. Indeed, the cited portions of Klebanoff explicitly state that "the sticking coefficient for both ethanol and water on a graphitic carbon is very small" (column 5, lines 3-4) implying that carbon on the surface prevents or limits hydrocarbon adsorption. Moreover, Klebanoff states that ethanol molecules "bound to surface 210 will also be dissociated by the secondary electrons ejected from that surface." Thus, ethanol molecules in Klebanoff will not remain on the surface 210 for long and there is no indication that they will form a layer. Consequently, Applicant submits that the Office Action has not established sufficiently, with proper evidence and a reasoned basis, that the presence of hydrocarbon in Klebanoff necessarily and inherently results in a hydrocarbon layer on a surface.

Further, page 4 of the Office Action alleges "[Klebanoff's disclosure that] '*Prior to exposing surface 210 to incident radiation, a small amount of a hydrocarbon gas that will also bind to surface 210 is admitted to the system' means that the binding of the hydrocarbon gas to the surface 210 forms a cap layer of hydrocarbon on the surface 210 before the cap layer is sputtered by the incident radiation. Moreover, because the sputtering will cause the hydrocarbon molecules bound to the surface 210 be dissociated, the thickness of the cap layer of hydrocarbon would not increase substantially over time. In addition, since the pressure gas is maintained at a certain value, the thickness of the hydrocarbon layer would not increase substantially over time due to the increase of the pressure gas)*, wherein, in use, the layer of hydrocarbon is formed on the mirror by absorption of the gaseous hydrocarbon (column 2, lines 14-16: 'Surface 110 has both hydrocarbon and water molecules adsorbed thereon')" (emphasis in original). Applicant respectfully traverses this allegation as at least unsupported by the quoted reference.

Firstly, the cited lines 63-65 in column 3 of Klebanoff do not mean that binding of the hydrocarbon gas to the surface 210 necessarily forms a cap layer of hydrocarbon, as alleged on page 4. As discussed above, Klebanoff fails to disclose or teach, expressly or inherently, that a hydrocarbon layer is formed. Indeed, the quoted portion states a "**small amount** of hydrocarbon" binds to the surface <u>in addition</u> to other materials (e.g., water – see Klebanoff, col. 2, lines 14-16).

Thus, there is by no means sufficient disclosure of a hydrocarbon layer in Klebanoff nor does the presence of a small amount of hydrocarbon in Klebanoff necessarily result in a hydrocarbon layer.

Secondly, the Office Action alleges that Klebanoff discloses sputtering by incident radiation. However, there is no disclosure or teaching in Klebanoff of sputtering. Sputtering involves removing material due to bombardment of the material by energetic ions. Klebanoff merely discloses ejection of secondary electrons from the surface of a material by high energy radiation, such as EUV radiation and discloses dissociation (a chemical process) caused by those electrons. Thus, the cited portions of Klebanoff are simply silent as to sputtering of anything, let alone sputtering of the alleged "hydrocarbon cap layer".

Thirdly, there is no support in Klebanoff, nor does it necessarily result from Klebanoff, that the thickness of the alleged hydrocarbon layer (which Applicant submits is not disclosed by Klebanoff as discussed above) does not increase substantially over time due to the alleged sputtering (which Applicant submits is not disclosed by Klebanoff as discussed above) in Klebanoff. There is simply no disclosure of the thickness of the hydrocarbon in Klebanoff, let alone of any mechanism, sputtering or otherwise, that limits its increase over time. There is only disclosure in Klebanoff of the thickness of a graphite carbon film. See Klebanoff, col. 5, lines 2-6.

Fourthly, the allegation that "since the pressure gas is maintained at a certain value, the thickness of the hydrocarbon layer would not increase substantially over time due to the increase of the pressure gas" is not supported by the cited portions of Klebanoff. All pressures and partial pressures disclosed by Klebanoff are filling pressures. Klebanoff is silent as to allegation that "the pressure gas is maintained at a certain value." Moreover, even if the pressure of the gas in Klebanoff were maintained at a certain value, there is simply no disclosure of, nor would it necessarily result, that a constant pressure would ensure that "the thickness of the hydrocarbon layer would not increase substantially over time" as alleged. Indeed, there is no disclosure, nor would it necessarily result, that an increasing pressure would cause increase of the thickness of a hydrocarbon layer.

Accordingly, as the cited portions of Tanaka and Klebanoff fail to disclose or render obvious each and every element of claims 1 and 20, reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of claims 1 and 20 based on Tanaka in view of Klebanoff are respectfully requested. Furthermore, as claims 2-9, 18, and 23 depend from claim 1, while claims 21-22 and 26 depend from claim 20, reconsideration and withdrawal of the 35 U.S.C. § 103(a)

rejections of claims 2-9, 18, 21-23, and 26 based on Tanaka in view of Klebanoff are respectfully requested at least by the virtue of their dependency as well as for the additional recitations therein.

Regarding claims 10 and 15, Applicant respectfully submits that cited portions of Tanaka and Klebanoff, taken individually or in any proper combination, fail to disclose or render obvious at least a method of manufacturing a device using a lithographic projection apparatus comprising, *inter alia*, monitoring at least one of a reflectivity of said mirror and a background pressure in said space, and controlling an amount of gaseous hydrocarbon supplied to said space to control, in response to the monitoring, a thickness of a hydrocarbon layer formed on the mirror using the gaseous hydrocarbon, as recited in claim 10, or supplying a gaseous alcohol to a space in a radiation system of the lithographic projection apparatus, which space contains a mirror, wherein the alcohol forms a cap layer on said mirror, wherein the projecting causes sputtering of the cap layer, and wherein the gaseous alcohol is supplied to said space at a pressure sufficient to achieve a thickness of said cap layer which does not increase substantially over time, as recited in claim 15.

As discussed above, the cited portions of Tanaka are silent as to any hydrocarbon (including alcohol). Further, for similar as reasons as discussed above, the cited portions of Klebanoff fail to disclose, teach, or otherwise render obvious control of a thickness of a hydrocarbon (alcohol) layer. For example, the cited portions of Klebanoff are silent as to a hydrocarbon layer, let alone its thickness and control thereof. Further, in the context of claim 15, the cited portions of Klebanoff are silent as to sputtering.

Accordingly, as the cited portions of Tanaka and Klebanoff fail to disclose or render obvious each and every element of claims 10 and 15, reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of claims 10 and 15 based on Tanaka in view of Klebanoff are respectfully requested. Furthermore, as claims 11 and 12, and 24 depend from claim 10, while claims 16, 19 and 25 depend from claim 15, reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejections of claims 11, 12, 16, 19, 24 and 25 based on Tanaka in view of Klebanoff are respectfully requested at least by the virtue of their dependency as well as for the additional recitations therein.

Claim 13 was rejected under 35 U.S.C. § 103(a) based on Tanaka in view of Klebanoff and further in view of U.S. Patent No. 6,469,785 to Duveneck et al. ("Duveneck"). The rejection is respectfully traversed.

As discussed above, Applicant respectfully submits that cited portions of Tanaka and Klebanoff, taken individually or in any proper combination, fail to disclose or render obvious claim 10. Applicant submits that the deficiencies of the cited portions of Tanaka and Klebanoff are not remedied by the cited portions of Duveneck. The cited portions of Duveneck merely disclose a 40 layer high efficiency mirror.

Accordingly, the cited portions of Tanaka, Klebanoff and Duveneck fail to disclose or render obvious each and every element of claim 13 at least by virtue of its dependency from claim 10, as well as the additional recitations therein. Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection of claim13 over Tanaka in view of Klebanoff and Duveneck is respectfully requested.

All rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact Applicant's representative at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 03-3975 under Order No. 081468/282980. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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